

Attachment A: Flow Frequency Memorandum

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
Picture Lake Campground – VA0070564

TO: Janine Howard

FROM: Jennifer Palmore, P.G.

DATE: February 3, 2011

COPIES: File

The Picture Lake Campground discharges to Picture Branch in Dinwiddie County, VA. The outfall is located at rivermile 5APCT001.23. Flow frequencies have been requested at this site for use in developing effluent limitations for the VPDES permit.

The USGS conducted 14 flow measurements on Hatcher Run from 1998 through 2007. The measurements were made at the Route 627 bridge near Five Forks, VA (#02046265). The measurements were correlated with the same day daily mean values from the continuous record gage on Stony Creek near Dinwiddie, VA (#02046000). The measurements and daily mean values were plotted on a logarithmic graph and a best fit power trend line was plotted through the data points. The required flow frequencies from the reference gage were plugged into the equation for the regression line and the associated flow frequencies at the measurement site were calculated. The flow frequencies for Hatcher Run were then projected to Picture Branch by drainage area proportion. The data for the reference gage, measurement site, and discharge point are presented below and the regression analysis is attached.

Stony Creek near Dinwiddie, VA (#02046000):

Drainage area: 112 mi²

Statistical period: 1946-2003

High flow months: Jan-Apr

1Q30 = 0.12 cfs	High Flow 1Q10 = 14 cfs
1Q10 = 0.26 cfs	High Flow 7Q10 = 18 cfs
7Q10 = 0.31 cfs	High Flow 30Q10 = 32 cfs
30Q10 = 0.77 cfs	HM = undetermined
30Q5 = 1.6 cfs	

Hatcher Run at Route 627 near Five Forks, VA (#02046265):

Drainage area = 6.77 mi²

1Q30 = 0.00 cfs	High Flow 1Q10 = 0.80 cfs
1Q10 = 0.01 cfs	High Flow 7Q10 = 1.07 cfs
7Q10 = 0.01 cfs	High Flow 30Q10 = 2.09 cfs
30Q10 = 0.03 cfs	HM = undetermined
30Q5 = 0.07 cfs	

Picture Branch at discharge point:

Drainage area = 3.50 mi²

1Q30 = 0.00 cfs (0.00 MGD)	High Flow 1Q10 = 0.42 cfs (0.27 MGD)
1Q10 = 0.00 cfs (0.00 MGD)	High Flow 7Q10 = 0.56 cfs (0.36 MGD)
7Q10 = 0.01 cfs (0.00 MGD)	High Flow 30Q10 = 1.1 cfs (0.70 MGD)
30Q10 = 0.01 cfs (0.01 MGD)	HM = undetermined
30Q5 = 0.03 cfs (0.02 MGD)	

The values at the discharge point were determined by drainage area proportions and do not address any withdrawals, discharges, or springs.

Please note that the discharge is located directly below Picture Lake dam. D.X. Ren states in his 4/12/1991 modeling memorandum that "The dam releases water via a spray nozzle. According to the operator, during the summer season, the dam reduces water flow. [The] flow analysis assumed outflow from the impoundment equalled (sic) inflow to the Lake. It is possible that actual low flow for this stream could be different from [the] calculated 7Q10 flow due to the effect on flows of the impoundment." Ren proceeded to use a previously-used 7Q10 flow of 0.0337 cfs for the model. Since the currently calculated flow is considerably less than the flow that was used for modeling, the calculated values should be used.

In addition, please note that previous flow analyses used measurements on Whipponock Creek. During this reissuance, I determined that a flow measurement on Whipponock was not included in the 1985 USGS Water Resources Data report and was therefore excluded from the previous analyses. Once this measurement was included, the correlation between Whipponock and Stony Creek was not acceptable for use ($R = 0.783$). The 2007 measurements collected on Hatcher Run enabled this site to be used this cycle. This site is a better choice as it is located within the same watershed as the discharge and there is a strong correlation between the measurements and Stony Creek ($R = 0.934$).

During the 2008 and draft 2010 305(b)/303(d) Water Quality Assessments, Picture Branch was assessed as a Category 2A water ("Waters are supporting all of the uses for which they were monitored.") The Aquatic Life Use is fully supporting and the Recreation-, Fish Consumption-, and Wildlife Uses were not assessed.

The stream is not included in any approved TMDL.

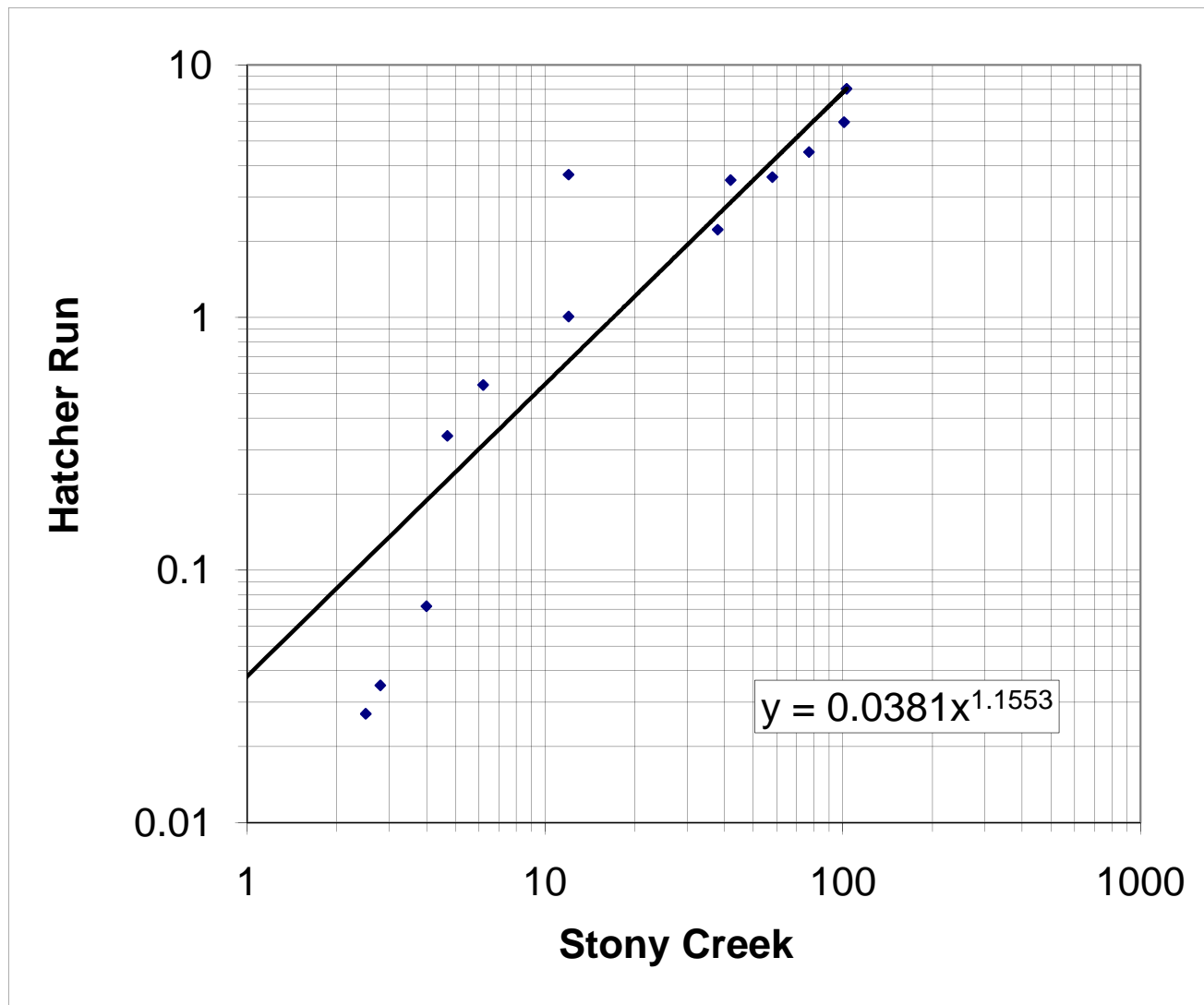
Picture Branch has historically been considered a Tier 1 water. Antidegradation was not applied during modeling efforts.

Ambient water quality data is attached for your use in developing permit limits. Field data was collected at station 5APCT001.23, which is located on Picture Branch at the Route 1 bridge near the outfall. However, hardness was not collected at this station; therefore hardness data from station 5AHRA010.94 is included. This station is located on Hatcher Run at the Route 631 bridge (Picture Branch is a tributary of Hatcher Run).

If you have any questions concerning this analysis, please let me know.

Hatcher Run at Route 627, near Five Forks, VA #02046265
vs Stony Creek near Dinwiddie, VA #02046000

Regression Analysis



Flow Data (cfs)

Date	Stony	Hatcher
9/10/1998	2.5	0.027
12/9/1998	6.2	0.541
2/9/1999	42	3.50
6/22/1999	12	3.68
1/30/2007	77	4.52
2/22/2007	103	8.05
3/6/2007	101	5.94
4/5/2007	58	3.60
5/25/2007	38	2.23
7/16/2007	2.8	0.035
8/7/2007	12	1.01
9/12/2007	4.7	0.340
9/26/2007	4.0	0.072
10/11/2007	0.80	0.096

SUMMARY OUTPUT

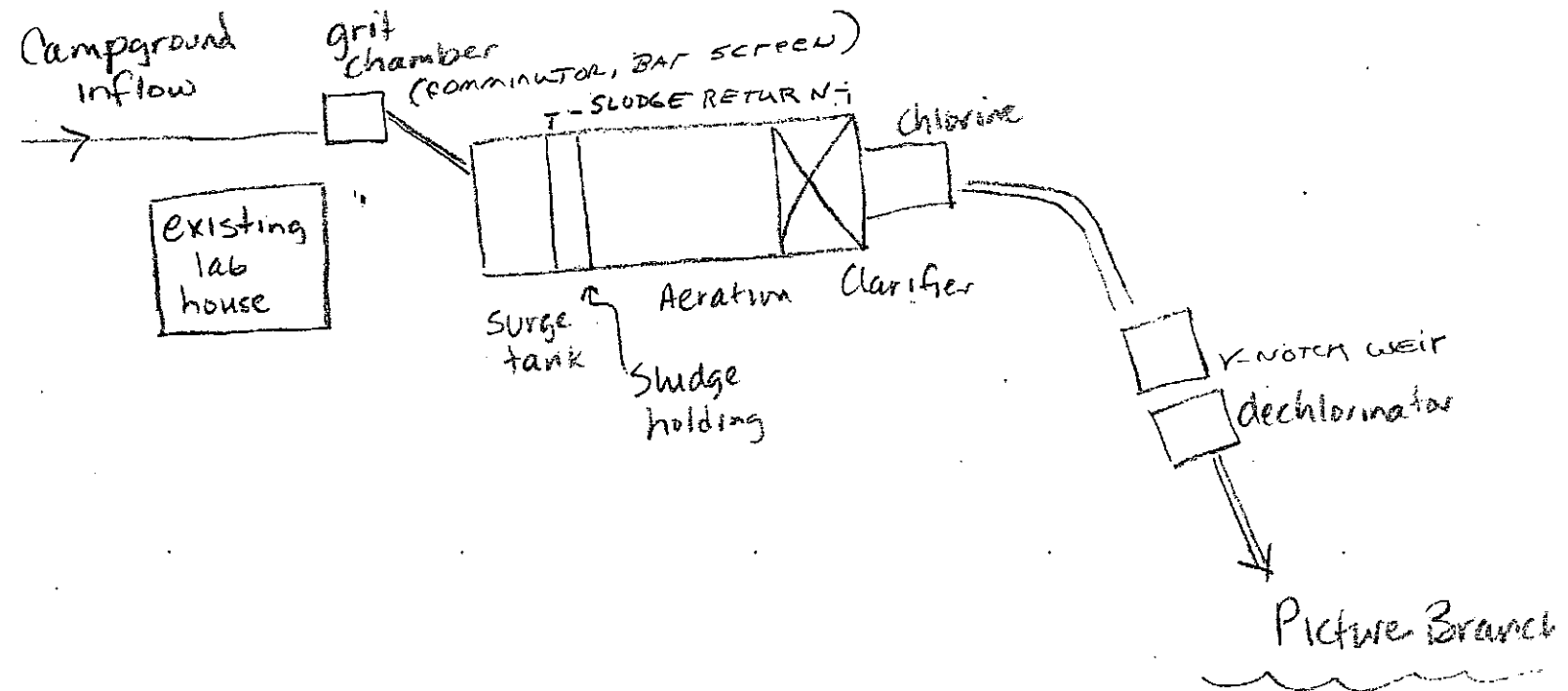
Regression Statistics	
Multiple R	0.934
R Square	0.873
Adjusted R Square	0.862
Standard Error	0.949
Observations	14

Flow Frequencies (cfs)

Stony		Hatcher	Picture
0.12	1Q30	0.00	0.00
0.26	1Q10	0.01	0.00
0.31	7Q10	0.01	0.01
0.77	30Q10	0.03	0.01
1.6	30Q5	0.07	0.03
14	HF 1Q10	0.80	0.42
18	HF 7Q10	1.07	0.56
32	HF 30Q10	2.09	1.1
--	HM	--	
112	DA (mi ²) Jan-Apr	6.77	3.50

Attachment B: Plant Flow Diagram

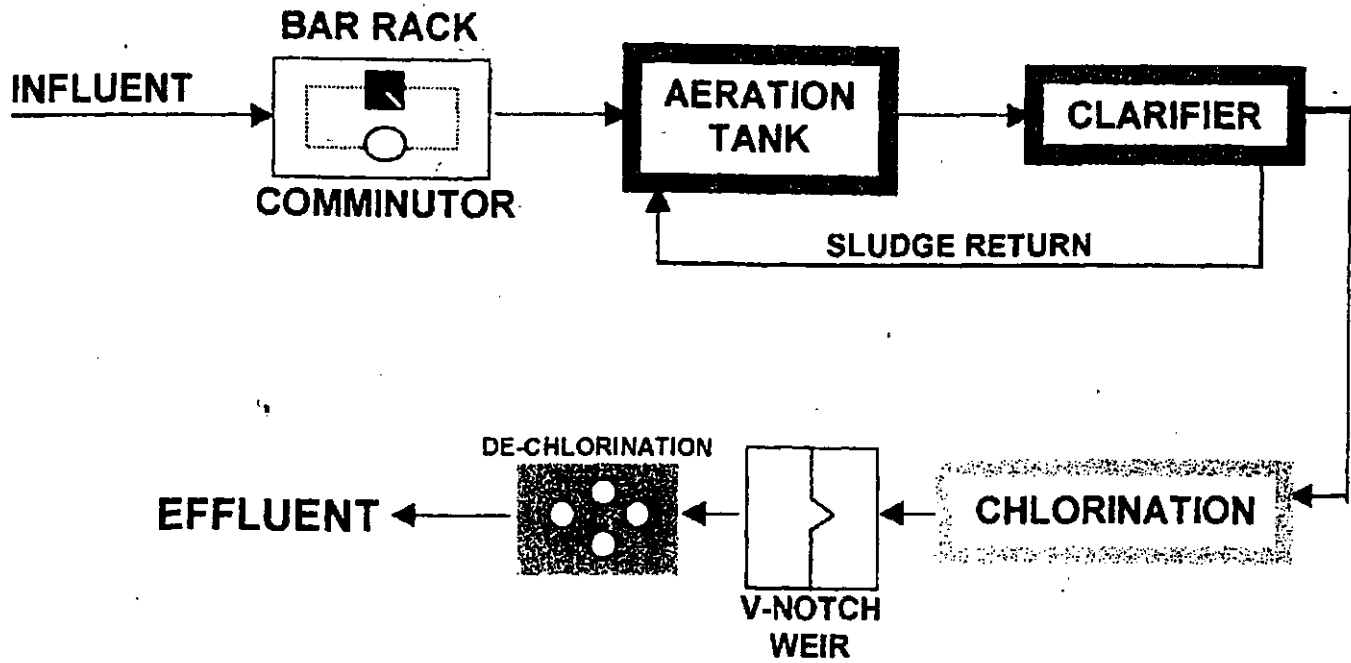
TREATMENT PLANT FLOW DIAGRAM



SITE PLAN
N.T.S.

FIGURE 1

VI. Treatment System (Describe briefly any treatment systems(s) used or to be used.



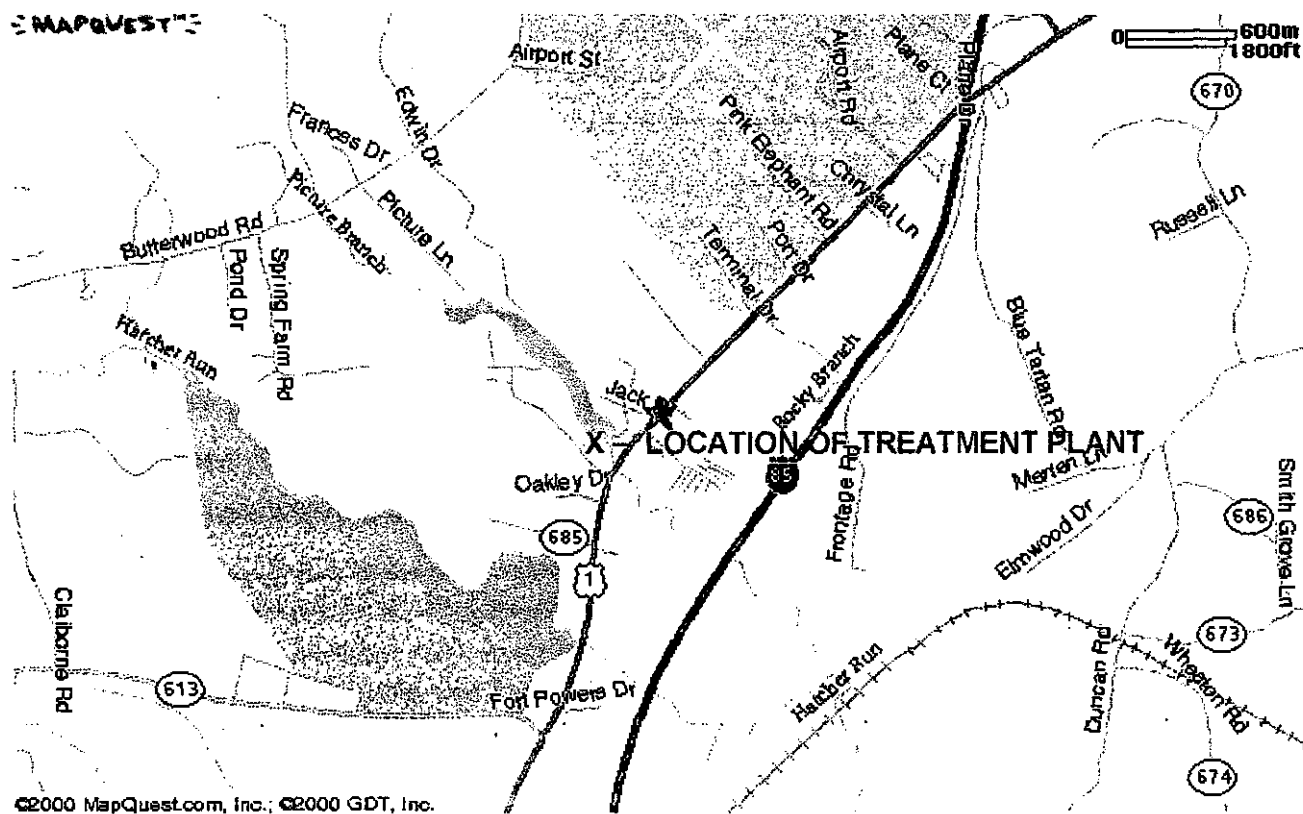
VII. Other Information (Optional)

Attachment C: Topographic Map, Sutherland Quadrangle (70A)
and Aerial Image

FACILITY NAME: H & B of Virginia, Inc.
PICTURE LAKE CAMPGROUND

VPDES PERMIT NUMBER: VA0070564

SECTION A - 5



TOPOGRAPHIC MAP OF AREA FOLLOWS

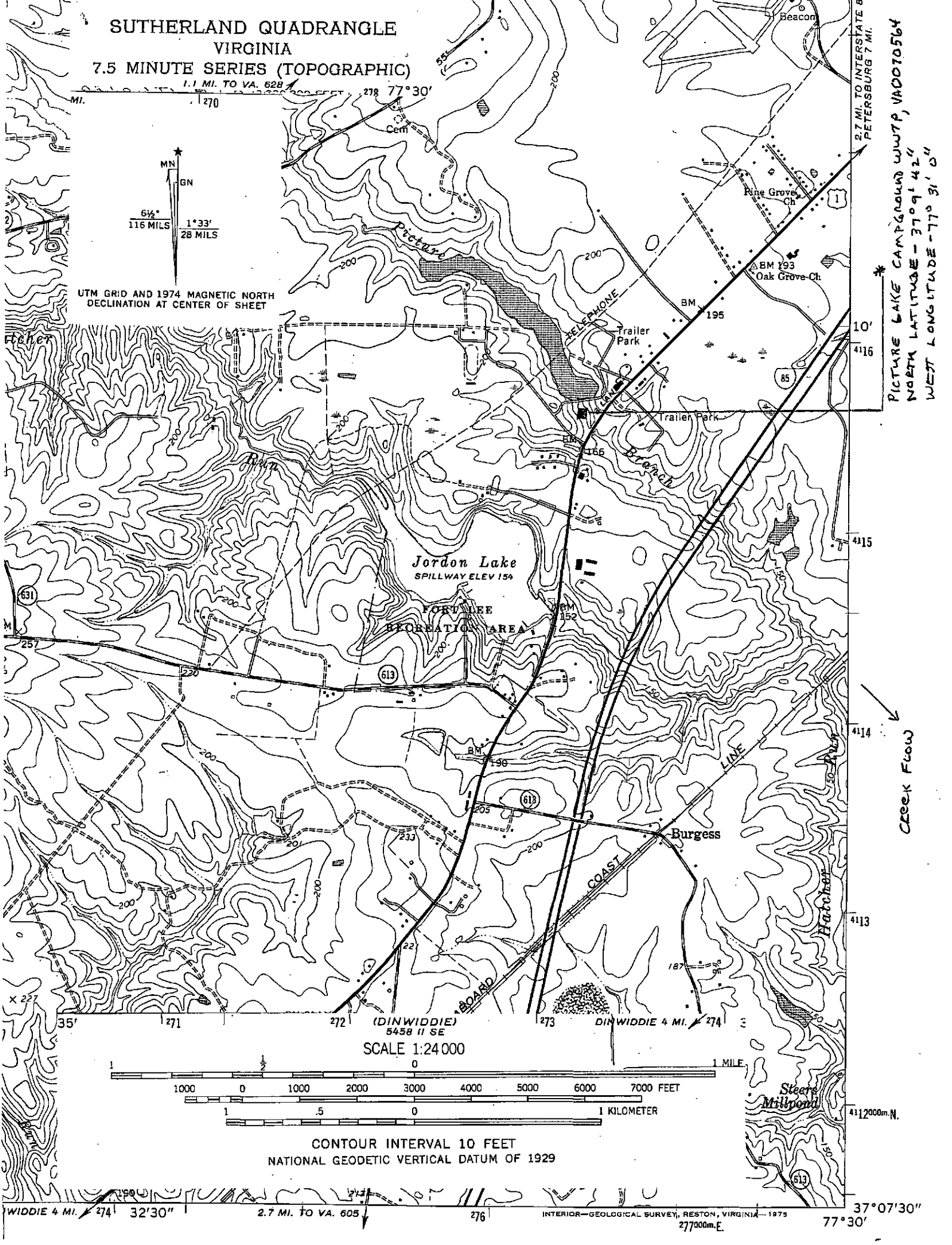
SUTHERLAND QUADRANGLE
VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

1.1 MI. TO VA. 628
278 77° 30'

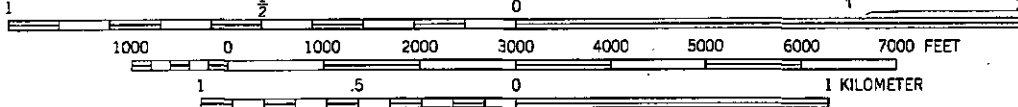
MN
GN
6 1/4" 116 MILS
1° 33' 28 MILS

UTM GRID AND 1974 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

2.7 MI. TO INTERSTATE 85
PETERSBURG 7 MI.
PICTURE LAKE CAMPGROUND WWTP, VA0070564
NORTH LATITUDE - 37° 9' 42"
WEST LONGITUDE - 77° 31' 0"



SCALE 1:24 000

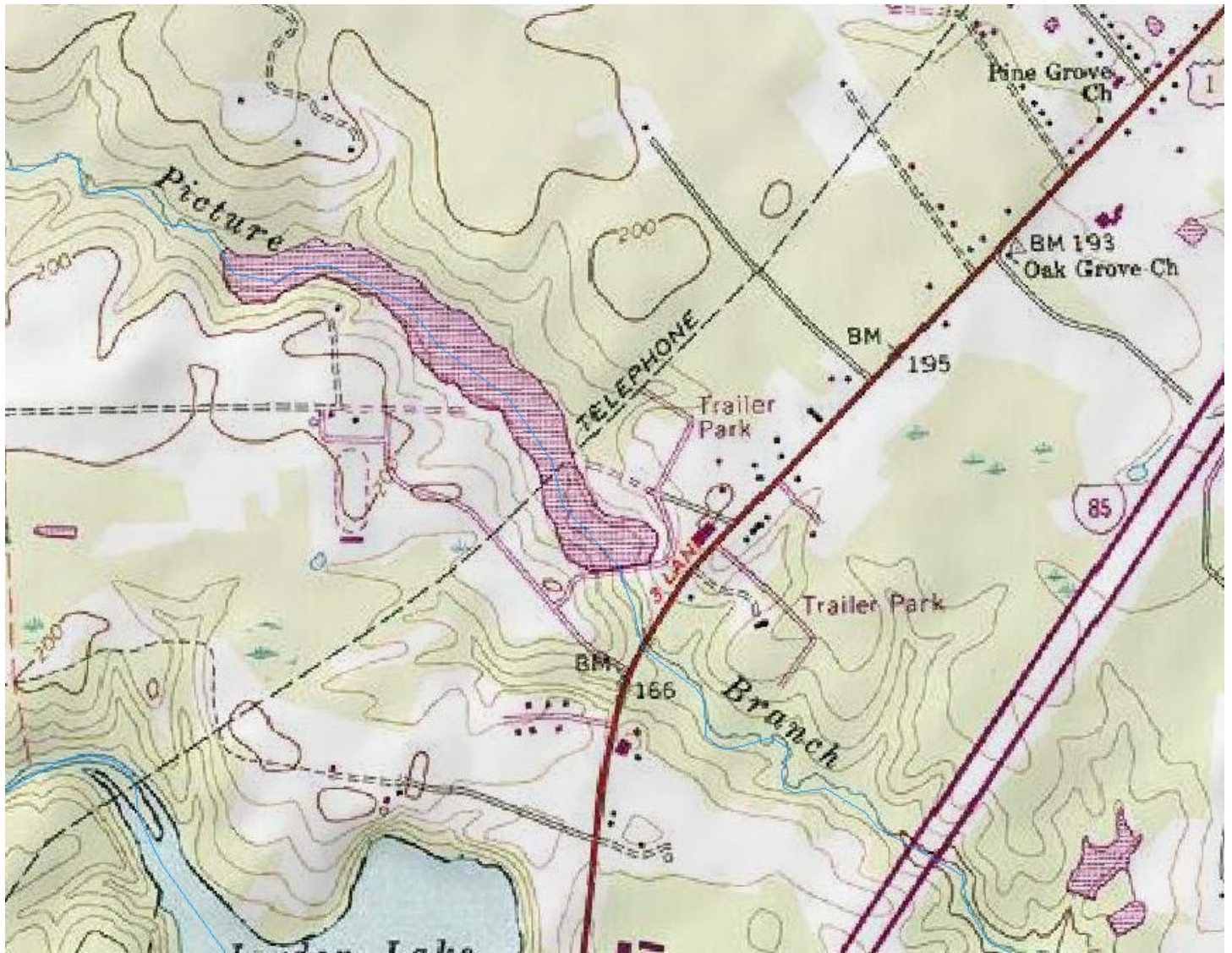


CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

WIDDIE 4 MI. 274 32'30" 2.7 MI. TO VA. 605 276 INTERIOR- GEOLOGICAL SURVEY, RESTON, VIRGINIA - 1975 277000m.E 37° 07' 30" 77° 30'



Aerial image of Picture Lake



Topographic Map (Sutherland Quadrangle 70A)

Attachment D: Site Inspection Report

Virginia Department of Environmental Quality

WASTEWATER FACILITY INSPECTION REPORT

FACILITY NAME: Picture Lake Campground WWTP		INSPECTION DATE: <u>October 20, 2010</u>	
PERMIT No.: <u>VA0070564</u>		INSPECTOR: <u>Mike Dare</u>	
TYPE OF FACILITY: <input checked="" type="checkbox"/> Municipal <input checked="" type="checkbox"/> Small Minor <input type="checkbox"/> Industrial <input type="checkbox"/> Federal		REPORT DATE: <u>October 25, 2010</u>	
		TIME OF INSPECTION:	Arrival 1245 Departure 1440
		TOTAL TIME SPENT (including prep & travel) <u>12 hours</u>	
PHOTOGRAPHS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		UNANNOUNCED INSPECTION? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
REVIEWED BY / Date:			
PRESENT DURING INSPECTION: <u>Ryan Porter</u>			

TECHNICAL INSPECTION

1. Has there been any new construction? • If so, were plans and specifications approved? <u>Comments:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Is the Operations and Maintenance Manual approved and up-to-date? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator being met? <u>Comments:</u> <u>An Operator requirement is not specified in the current permit</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? <u>Comments:</u> <u>The facility is checked daily by campground personnel and weekly by a certified Operator.</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5. Is there an established and adequate program for training personnel? <u>Comments:</u> <u>OJT and DEQ Operator Assistance Training</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
6. Are preventive maintenance task schedules being met? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
7. Does the plant experience any organic or hydraulic overloading? <u>Comments:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
8. Has there been any bypassing or overflows since the last inspection? <u>Comments:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
9. Is the standby generator (including power transfer switch) operational and exercised regularly? <u>Comments:</u> <u>N/A; there is no standby generator. Mr. Porter reported that a portable generator is available at the campground.</u>	<input type="checkbox"/> Yes <input type="checkbox"/> No
10. Is the plant alarm system operational and tested regularly? <u>Comments:</u> <u>N/A; the plant is not equipped with an alarm system.</u>	<input type="checkbox"/> Yes <input type="checkbox"/> No

VA DEQ Wastewater Facility Inspection Report

Permit #	VA0070564
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TECHNICAL INSPECTION

11. Is sludge disposed of in accordance with the approved sludge management plan? <u>Comments: Sludge is removed periodically by a septic hauler for discharge at a regional wastewater treatment plant.</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? <u>Comments:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? <u>Comments: The maintenance of an operational log was recently discontinued. Resumption is recommended.</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
14. Which of the following records does the plant maintain? <input type="checkbox"/> Operational logs <input checked="" type="checkbox"/> Instrument maintenance & calibration <input type="checkbox"/> Mechanical equipment maintenance <input type="checkbox"/> Industrial Waste Contribution (Municipal facilities) <u>Comments:</u>	
15. What does the operational log contain? <input type="checkbox"/> Visual observations <input checked="" type="checkbox"/> Flow Measurement <input checked="" type="checkbox"/> Laboratory results <input type="checkbox"/> Process adjustments <input type="checkbox"/> Control calculations <input type="checkbox"/> Other (specify) <u>Comments: Above maintained on bench sheets.</u>	
16. What do the mechanical equipment records contain? <input type="checkbox"/> As built plans and specs <input type="checkbox"/> Manufacturers instructions <input type="checkbox"/> Lubrication schedules <input checked="" type="checkbox"/> Spare parts inventory <input type="checkbox"/> Equipment/parts suppliers <input type="checkbox"/> Other (specify) <u>Comments:</u>	
17. What do the industrial waste contribution records contain (Municipal only)? <input type="checkbox"/> Waste characteristics <input type="checkbox"/> Impact on plant <input type="checkbox"/> Locations and discharge types <input type="checkbox"/> Other (specify) <u>Comments: N/A</u>	
18. Which of the following records are kept at the plant and available to personnel? <input type="checkbox"/> Equipment maintenance records <input type="checkbox"/> Operational log <input type="checkbox"/> Industrial contributor records <input checked="" type="checkbox"/> Instrumentation records <input checked="" type="checkbox"/> Sampling and testing records <u>Comments:</u>	
19. List records not normally available to plant personnel and their location: <u>Comments: All records available at the campground.</u>	
20. Are the records maintained for the required time period (three or five years)? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

VA DEQ Wastewater Facility Inspection Report

Permit #	VA0070564
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UNIT PROCESS EVALUATION SUMMARY SHEET

<u>UNIT PROCESS</u>	<u>APPLICABLE</u>	<u>PROBLEMS*</u>	<u>COMMENTS</u>
Sewage Pumping			
Flow Measurement (Influent)			
Screening/Comminution	Yes		
Grit Removal			
Oil/Water Separator			
Flow Equalization			
Ponds/Lagoons			
Imhoff Tank			
Primary Sedimentation			
Trickling Filter			
Septic Tank and Sand Filter			
Rotating Biological Contactor			
Activated Sludge Aeration	Yes		
Biological Nutrient Removal			
Sequencing Batch Reactor			
Secondary Sedimentation	Yes		
Flocculation			
Tertiary Sedimentation			
Filtration			
Micro-Screening			
Activated Carbon Adsorption			
Chlorination	Yes		
Dechlorination	Yes	6	One tube is missing a cap
Ozonation			
Ultraviolet Disinfection			
Post Aeration	Yes		Step aerator
Flow Measurement (Effluent)	Yes		Estimated
Land Application (Effluent)			
Plant Outfall	Yes		
Sludge Pumping			
Flotation Thickening (DAF)			
Gravity Thickening			
Aerobic Digestion	Yes		Sludge holding tank
Anaerobic Digestion			
Lime Stabilization			
Centrifugation			
Sludge Press			
Vacuum Filtration			
Drying Beds			
Thermal Treatment			
Incineration			
Composting			
Land Application (Sludge)			

* Problem Codes

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Unit Needs Attention 2. Abnormal Influent/Effluent 3. Evidence of Equipment Failure | <ol style="list-style-type: none"> 4. Unapproved Modification or Temporary Repair 5. Evidence of Process Upset 6. Other (explain in comments) |
|--|--|

VA DEQ Wastewater Facility Inspection Report

Permit #

VA0070564

INSPECTION PHOTOS



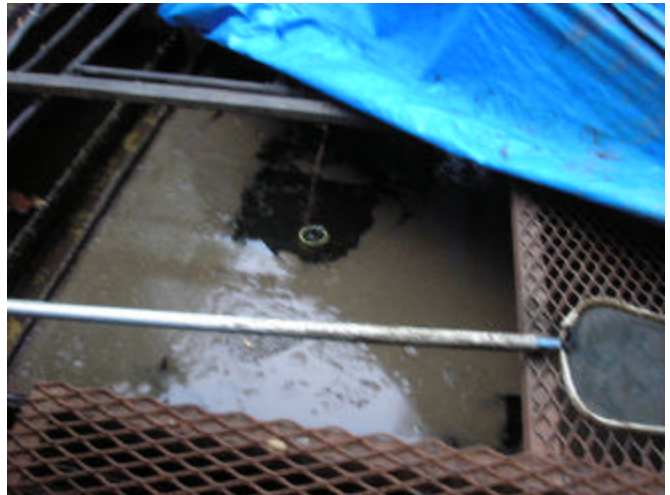
Package plant consists of aeration, clarifier and sludge holding basins. Bleach addition system is at far right.



Raw sewage enters aeration basin at center of photo



A thick dark foam has accumulated at one corner of the aeration basin



A layer of solids covers much of clarifier surface



Sodium bisulfite tablet dechlorination system



Plant outfall at the Picture Branch

VA DEQ Wastewater Facility Inspection Report

Permit #	VA0070564
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EFFLUENT FIELD DATA:

Flow	<input type="text" value="0.003"/> MGD	Dissolved Oxygen	<input type="text" value="6.76"/> mg/L	TRC (Contact Tank)	<input type="text" value="-----"/> mg/L
pH	<input type="text" value="6.0"/> S.U.	Temperature	<input type="text" value="18.6"/> °C	TRC (Final Effluent)	<input type="text" value="0.00"/> mg/L
Was a Sampling Inspection conducted? <input type="checkbox"/> Yes (see Sampling Inspection Report) <input checked="" type="checkbox"/> No					

CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

- Type of outfall: ☒ Shore based ☐ Submerged Diffuser? ☐ Yes ☒ No
- Are the outfall and supporting structures in good condition? ☒ Yes ☐ No
- Final Effluent (evidence of following problems):

<input type="checkbox"/> Sludge bar	<input type="checkbox"/> Grease
<input type="checkbox"/> Turbid effluent	<input type="checkbox"/> Visible foam
<input type="checkbox"/> Unusual color	<input type="checkbox"/> Oil sheen
- Is there a visible effluent plume in the receiving stream? ☐ Yes ☒ No
- Receiving stream: ☒ No observed problems ☐ Indication of problems (explain below)
Comments: Receiving stream appeared clear. Plant effluent was slightly turbid.

REQUIRED CORRECTIVE ACTIONS:

- Maintenance of an operational log was recently discontinued. Resumption is recommended. The operational log should include at a minimum: names/times of Operator attendance, visual observations, process adjustments and equipment maintenance.
- One of the dechlorination system tablet feeder tubes is missing a cap. The cap should be replaced.
- The pH of the plant effluent was 6.0 at the time of inspection. Plant effluent pH results indicated on the September 2010 DMR range from 6 to 9. Please discuss possible methods to reduce this wide fluctuation. e.g., If lime is being added to the aeration basin in large single applications, smaller more routine applications would be recommended.

NOTES and COMMENTS:

The characteristics of the solids at this plant are that of an old, over-oxidized sludge - dark brown mixed liquor, a patch of thick dark foam on the aeration basin, light, fluffy solids on the surface of the clarifier and a slightly turbid effluent. This is contradicted by process control test results that indicate a younger sludge - low settleability (200 ml/L) and low MLSS (1900 mg/L). BOD₅, TSS and Ammonia results reported on the DMR for September 2010 were well below permit limits. No changes in operation are recommended by this writer at this time. Jason Spicer of DEQ's Operator Training and Assistance Program concurred with this approach when contacted by phone on October 25, 2010. Mr. Spicer pointed out that indicators typical to most activated sludge plants may not be appropriate here due to the age and limited treatment capability of this facility. Continued weekly process control testing by a certified Operator is strongly encouraged.

Attachment E: DMR data, Application (EPA Form 2A) data,
Ambient Stream Data

Effluent (DMR) data

Flow Average (MGD)	Flow Maximum (MGD)	pH (min) S.U.	pH (max) S.U.	Dissolved Oxygen (min) (mg/l)	DMR Due Date
0.0029	0.0029	7	7	7	10-Nov-06
0.0028	0.0029	7	7	7	10-Dec-06
0.0028	0.0029	7	7	7	10-Jan-07
0.0029	0.0029	7	7	7	10-Feb-07
0.0029	0.0029	7	7	7	10-Mar-07
0.0029	0.0029	7	8	7	10-Apr-07
0.0029	0.0029	7	7	7	10-May-07
0.0029	0.0029	7	7	7	10-Jun-07
0.0029	0.0029	7	8	7	10-Jul-07
0.0033	0.0058	7	8	NULL	10-Aug-07
0.0031	0.0058	7	8	7	10-Sep-07
0.0029	0.0029	7	8	7	10-Oct-07
0.0033	0.0058	7	8	7	10-Nov-07
0.003	0.003	7	8	7	10-Dec-07
0.0029	0.0058	7	8	7	10-Jan-08
0.0029	0.0029	7	7	7	10-Feb-08
0.0029	0.0029	7	8	7	10-Mar-08
0.0041	0.0058	7	8	7	10-Apr-08
0.0055	0.0058	7	7	7	10-May-08
0.0057	0.0058	7	8	7	10-Jun-08
0.0058	0.0058	7	7	0.8	10-Jul-08
0.0058	0.0058	7	7	7	10-Aug-08
0.0058	0.0058	7	7	7	10-Sep-08
0.0058	0.0058	7	7	7	10-Oct-08
0.0058	0.0058	7	8	7	10-Nov-08
0.0058	0.0058	7	8	7	10-Dec-08
0.0038	0.0058	7	7	7	10-Jan-09
0.0029	0.0029	7	7	7	10-Feb-09

Flow Average (MGD)	Flow Maximum (MGD)	pH (min) S.U.	pH (max) S.U.	Dissolved Oxygen (min) (mg/l)	DMR Due Date
0.0029	0.0029	7	7	7	10-Mar-09
0.0029	0.0029	7	7	7	10-Apr-09
0.0029	0.0029	7	7	7	10-May-09
0.0029	0.0029	7	7	7	10-Jun-09
0.0029	0.0029	7	7	7	10-Jul-09
0.0029	0.0029	6	8	7	10-Aug-09
0.0029	0.0029	7	8	7	10-Sep-09
0.0029	0.0029	7	7.8	7	10-Oct-09
0.0029	0.0029	7	7	7	10-Nov-09
0.0033	0.0043	7	7	7	10-Dec-09
0.001	0.0029	6	9	7	10-Jan-10
0.0007	0.0007	7	9	9.7	10-Feb-10
0.0007	0.0007	7	9	9.7	10-Mar-10
0.0007	0.0007	7	9	9.7	10-Apr-10
0.0029	0.0029	6	9	7	10-May-10
0.0029	0.0029	7	9	1.6	10-Jun-10
0.0029	0.0029	6	9	8	10-Jul-10
0.0029	0.0029	6	9	8	10-Aug-10
0.0029	0.0029	6	9	7	10-Sep-10
0.0029	0.0029	6	9	7	10-Oct-10
0.0029	0.0029	6	9	NULL	10-Nov-10
0.0029	0.0029	6.3	7.2	6.1	10-Dec-10
			Max 10 th Percentile: 7 Max 90 th percentile: 9		

Monthly Average DMR data

BOD ₅ (mg/l)	TSS (mg/l)	TRC (mg/l)	Ammonia-N (mg/l)	DMR Due Date
10.8	5.2	<QL	Starting with 10-Jun-09 DMR	10-Nov-06
9	2.2	<QL		10-Dec-06
10.7	10	<QL		10-Jan-07
13.9	3.8	<QL		10-Feb-07
8.4	1.2	<QL		10-Mar-07
5.9	3	<QL		10-Apr-07
16.5	9.4	<QL		10-May-07
<2.0	2.4	<QL		10-Jun-07
5.8	2.2	<QL		10-Jul-07
4.6	18.2	<QL		10-Aug-07
3.7	4.8	<QL		10-Sep-07
3.8	1.5	<QL		10-Oct-07
4.5	3.1	1		10-Nov-07
2.2	1.4	<QL		10-Dec-07
31.4	6	<QL		10-Jan-08
12	13.2	<QL		10-Feb-08
12.8	4.4	<QL		10-Mar-08
5.5	2.5	<QL		10-Apr-08
14	<1.0	<QL		10-May-08
3.5	5.6	<QL		10-Jun-08
<3.0	<1.0	<QL		10-Jul-08
3.6	1.2	<QL		10-Aug-08
<3.0	<1.0	<QL		10-Sep-08
3.6	3.5	<QL		10-Oct-08
3.2	1.7	<QL		10-Nov-08
4	3.8	<QL		10-Dec-08
<1.0	2.9	<QL		10-Jan-09

BOD ₅ (mg/l)	TSS (mg/l)	TRC (mg/l)	Ammonia-N (mg/l)	DMR Due Date
4.4	5.7	<QL		10-Feb-09
<3.0	10.5	<QL		10-Mar-09
<3.0	7.8	<QL		10-Apr-09
<2.0	4.2	<QL		10-May-09
27.7	10.1	<QL	9.5	10-Jun-09
4.1	3	<QL	3.1	10-Jul-09
2.4	4.4	CL2, INST TECH MIN LIMIT	15.6	10-Aug-09
31.2	1.6	<QL	0.1	10-Sep-09
15.6	2	<QL	3.55	10-Oct-09
5.1	4	<QL	1.06	10-Nov-09
8.6	6	<QL	26.5	10-Dec-09
11.7	17	<QL	1.78	10-Jan-10
13.2	11	<QL	0.23	10-Feb-10
8.5	24.8	<QL	0.14	10-Mar-10
9.3	18	<QL	0.46	10-Apr-10
4.4	8.5	<QL	2.5	10-May-10
20.8	13.6	<QL	7.96	10-Jun-10
26.8	25.6	<QL	40.6	10-Jul-10
3.9	11.8	<QL	0.4	10-Aug-10
<2.0	18.5	<QL	0.16	10-Sep-10
2.3	3.7	<QL	0.37	10-Oct-10
4.8	12.1	NULL	0.57	10-Nov-10
19.7	25	<QL	2.86	10-Dec-10

Application (EPA Form 2A) data

Parameter	Maximum Daily Value		Average Daily Value		
	Value	Units	Value	Units	No. Samples
pH (minimum)	6.0	S.U.			
pH (maximum)	9.0	S.U.			
Flow Rate	0.0029	MGD	0.0023	MGD	334
Temperature (Winter)	14	°C	UNK	NA	Estimate
Temperature (Summer)	24	°C	UNK	NA	Estimate

Pollutant	Maximum Daily Discharge		Average Daily Discharge		
	Conc.	Units	Conc.	Units	No. Samples
BOD ₅	26.8	mg/l	10.5	mg/l	11
Fecal Coliform	<2	N/100 ml	<2	N/100 ml	3
TSS	25.6	mg/l	15.7	mg/l	11

Ambient Stream Data

Station ID	Collection Date	Depth	Temp Celcius	Field Ph	Do Probe
5APCT001.23	7/13/1994	0.3	27.74	6.51	3.94
5APCT001.23	1/23/2006	0.3	7.03	6.02	10.32
5APCT001.23	2/14/2006	0.3	6.15	6.13	11.01
5APCT001.23	3/22/2006	0.3	8	6.7	9.4
5APCT001.23	4/24/2006	0.3	20.2	6.1	6.1
5APCT001.23	5/23/2006	0.3	18.4	6.1	5.4
5APCT001.23	6/29/2006	0.3	28.1	6.1	5.6
5APCT001.23	7/18/2006	0.3	28.8	6.3	4.7
5APCT001.23	8/21/2006	0.3	24.4	6.7	4.5
90th Percentile			28.2	6.7	
10th Percentile			6.9	6.1	

Station ID	Collection Date Time	Depth	HARDNESS, TOTAL (MG/L AS CaCO3)
5AHRA010.94	06/12/2001 13:30	0.3	11.5
	08/13/2001 17:15	0.3	27.9
	10/23/2001 16:00	0.3	15.1
	12/05/2001 16:20	0.3	10.2
	02/21/2002 15:00	0.3	19.1
	04/02/2002 15:48	0.3	10
	06/20/2002 15:45	0.3	37.2
	07/16/2002 11:30	0.3	45.5
	09/19/2002 15:35	0.3	24.5
	11/25/2002 14:20	0.3	12.1
	01/15/2003 14:15	0.3	10.7
	03/20/2003 16:00	0.3	16.6
	05/14/2003 15:00	0.3	20.7
	01/18/2007 12:10	0.3	10
	03/21/2007 11:15	0.3	10
	05/30/2007 11:05	0.3	23
Mean			19.0

Attachment F: MSTRANTI data source report, MSTRANTI,
Stats.exe results

MSTRANTI DATA SOURCE REPORT

Stream information	
Mean Hardness	Ambient Stream Data (Station 5AHRA010.94)
90% Temperature (annual)	Ambient Stream Data (Station 5APCT001.23)
90% Temperature (wet season)	NA
90% Maximum pH	Ambient Stream Data (Station 5APCT001.23)
10% Maximum pH	Ambient Stream Data (Station 5APCT001.23)
Tier Designation	Tier Determination
Stream Flows	
All Data	Flow Frequency Determination
Mixing Information	
All Data	Mix.exe determination (30Q10) and 100% mix assumption for 0.0 MGD 1Q10 and 7Q10 flows
Effluent Information	
Mean Hardness	Default value absent of data (25 mg/L as CaCO ₃)
90% Temperature (annual)	Calculated from Station 5APCT001.23 data (see Fact sheet item 16)
90% Maximum pH	Calculated from DMR data (9.0 SU)
10% Maximum pH	Calculated from DMR data (7.0 SU)
Discharge flow	Design Flow (0.013 MGD)

Data Location:

Flow Frequency Memo – Attachment A

Ambient Stream Data- see Fact sheet Item 13 and Attachment E for details

DMR data- Attachment E

Mixing Zone Predictions for

mix.txt
Picture Lake Campground

Effluent Flow = .013 MGD
Stream 7Q10 = .0001 MGD
Stream 30Q10 = 0.01 MGD
Stream 1Q10 = .0001 MGD
Stream slope = .00038 ft/ft
Stream width = 4 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .0951 ft
Length = 105.26 ft
Velocity = .0533 ft/sec
Residence Time = .0228 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .1342 ft
Length = 77.98 ft
Velocity = .0663 ft/sec
Residence Time = .0136 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .0951 ft
Length = 105.26 ft
Velocity = .0533 ft/sec
Residence Time = .5483 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Virginia DEQ Mixing Zone Analysis Version 2.1

Note: The flow frequency analysis (Attachment A) indicated 0.0 MGD flows for the 7Q10 and the 1Q10. Therefore, low dummy values were entered into Mix.exe to force the program to provide a mix assumption for the 30Q10 flow.

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: **Picture Lake Campground**

Permit No.: **VA0070564**

Receiving Stream: **Picture Lake**

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	19 mg/L
90% Temperature (Annual) =	28.2 deg C
90% Temperature (Wet season) =	deg C
90% Maximum pH =	6.7 SU
10% Maximum pH =	6.1 SU
Tier Designation (1 or 2) =	1
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0 MGD
7Q10 (Annual) =	0 MGD
30Q10 (Annual) =	0.01 MGD
1Q10 (Wet season) =	0.27 MGD
30Q10 (Wet season) =	0.7 MGD
30Q5 =	0.02 MGD
Harmonic Mean =	MGD

Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	%
- 30Q10 Mix =	%

Effluent Information

Mean Hardness (as CaCO3) =	25 mg/L
90% Temp (Annual) =	28.2 deg C
90% Temp (Wet season) =	deg C
90% Maximum pH =	9 SU
10% Maximum pH =	7 SU
Discharge Flow =	0.013 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	5	--	--	na	9.9E+02	--	--	na	2.5E+03	--	--	--	--	--	--	--	--	--	--	na	2.5E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
Acrylonitrile ^C	0	--	--	na	2.5E+00	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	na	2.5E+00
Aldrin ^C	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	5.0E-04	--	--	--	--	--	--	--	--	3.0E+00	--	na	5.0E-04
Ammonia-N (mg/l) (Yearly)	0	1.32E+00	2.39E+00	na	--	1.32E+00	4.23E+00	na	--	--	--	--	--	--	--	--	--	1.32E+00	4.23E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	1.32E+00	4.86E-01	na	--	1.32E+00	4.86E-01	na	--	--	--	--	--	--	--	--	--	1.32E+00	4.86E-01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.0E+05	--	--	--	--	--	--	--	--	--	--	na	1.0E+05
Antimony	0	--	--	na	6.4E+02	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene ^C	0	--	--	na	5.1E+02	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	--	--	na	5.1E+02
Benzidine ^C	0	--	--	na	2.0E-03	--	--	na	2.0E-03	--	--	--	--	--	--	--	--	--	--	na	2.0E-03
Benzo (a) anthracene ^C	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (b) fluoranthene ^C	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (k) fluoranthene ^C	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (a) pyrene ^C	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Bis(2-Chloroethyl) Ether ^C	0	--	--	na	5.3E+00	--	--	na	5.3E+00	--	--	--	--	--	--	--	--	--	--	na	5.3E+00
Bis(2-Chloroisopropyl) Ether	0	--	--	na	6.5E+04	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	--	--	na	1.7E+05
Bis 2-Ethylhexyl Phthalate ^C	0	--	--	na	2.2E+01	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	--	--	na	2.2E+01
Bromoform ^C	0	--	--	na	1.4E+03	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	4.8E+03	--	--	--	--	--	--	--	--	--	--	na	4.8E+03
Cadmium	0	8.2E-01	3.8E-01	na	--	8.2E-01	3.8E-01	na	--	--	--	--	--	--	--	--	--	8.2E-01	3.8E-01	na	--
Carbon Tetrachloride ^C	0	--	--	na	1.6E+01	--	--	na	1.6E+01	--	--	--	--	--	--	--	--	--	--	na	1.6E+01
Chlordane ^C	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	8.1E-03	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	8.1E-03
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	4.1E+03	--	--	--	--	--	--	--	--	--	--	na	4.1E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^C	0	--	--	na	1.3E+02	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.8E+04	--	--	--	--	--	--	--	--	--	--	na	2.8E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	4.1E+03	--	--	--	--	--	--	--	--	--	--	na	4.1E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	1.8E+02	2.4E+01	na	--	1.8E+02	2.4E+01	na	--	--	--	--	--	--	--	--	--	1.8E+02	2.4E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene ^C	0	--	--	na	1.8E-02	--	--	na	1.8E-02	--	--	--	--	--	--	--	--	--	--	na	1.8E-02
Copper	0	3.6E+00	2.7E+00	na	--	3.6E+00	2.7E+00	na	--	--	--	--	--	--	--	--	--	3.6E+00	2.7E+00	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	4.1E+04	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	4.1E+04
DDD ^C	0	--	--	na	3.1E-03	--	--	na	3.1E-03	--	--	--	--	--	--	--	--	--	--	na	3.1E-03
DDE ^C	0	--	--	na	2.2E-03	--	--	na	2.2E-03	--	--	--	--	--	--	--	--	--	--	na	2.2E-03
DDT ^C	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.2E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	2.2E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	na	--
Dibenz(a,h)anthracene ^C	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.4E+03	--	--	--	--	--	--	--	--	--	--	na	2.4E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	4.8E+02	--	--	--	--	--	--	--	--	--	--	na	4.8E+02
3,3-Dichlorobenzidine ^C	0	--	--	na	2.8E-01	--	--	na	2.8E-01	--	--	--	--	--	--	--	--	--	--	na	2.8E-01
Dichlorobromomethane ^C	0	--	--	na	1.7E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	na	1.7E+02
1,2-Dichloroethane ^C	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	3.7E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	--	--	na	1.8E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.5E+04	--	--	--	--	--	--	--	--	--	--	na	2.5E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane ^C	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
1,3-Dichloropropene ^C	0	--	--	na	2.1E+02	--	--	na	2.1E+02	--	--	--	--	--	--	--	--	--	--	na	2.1E+02
Dieldrin ^C	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	5.4E-04	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	5.4E-04
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.8E+06	--	--	--	--	--	--	--	--	--	--	na	2.8E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	7.1E+02	--	--	--	--	--	--	--	--	--	--	na	7.1E+02
2,4-Dinitrotoluene ^C	0	--	--	na	3.4E+01	--	--	na	3.4E+01	--	--	--	--	--	--	--	--	--	--	na	3.4E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.3E-07	--	--	--	--	--	--	--	--	--	--	na	1.3E-07
1,2-Diphenylhydrazine ^C	0	--	--	na	2.0E+00	--	--	na	2.0E+00	--	--	--	--	--	--	--	--	--	--	na	2.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	2.3E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.3E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	2.3E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.3E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	2.3E+02	--	--	--	--	--	--	--	--	--	--	na	2.3E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	1.5E-01	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	1.5E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	7.6E-01	--	--	--	--	--	--	--	--	--	--	na	7.6E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	--	--	na	5.3E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor ^C	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	7.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	7.9E-04
Heptachlor Epoxide ^C	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	3.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	3.9E-04
Hexachlorobenzene ^C	0	--	--	na	2.9E-03	--	--	na	2.9E-03	--	--	--	--	--	--	--	--	--	--	na	2.9E-03
Hexachlorobutadiene ^C	0	--	--	na	1.8E+02	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Hexachlorocyclohexane Alpha-BHC ^C	0	--	--	na	4.9E-02	--	--	na	4.9E-02	--	--	--	--	--	--	--	--	--	--	na	4.9E-02
Hexachlorocyclohexane Beta-BHC ^C	0	--	--	na	1.7E-01	--	--	na	1.7E-01	--	--	--	--	--	--	--	--	--	--	na	1.7E-01
Hexachlorocyclohexane Gamma-BHC ^C (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.8E+00	--	--	--	--	--	--	--	--	9.5E-01	--	na	1.8E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Hexachloroethane ^C	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene ^C	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone ^C	0	--	--	na	9.6E+03	--	--	na	9.6E+03	--	--	--	--	--	--	--	--	--	--	na	9.6E+03
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	2.0E+01	2.3E+00	na	--	2.0E+01	2.3E+00	na	--	--	--	--	--	--	--	--	--	2.0E+01	2.3E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	7.7E-01	--	--	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Methylene Chloride ^C	0	--	--	na	5.9E+03	--	--	na	5.9E+03	--	--	--	--	--	--	--	--	--	--	na	5.9E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	5.6E+01	6.3E+00	na	4.6E+03	5.6E+01	6.3E+00	na	1.2E+04	--	--	--	--	--	--	--	--	5.6E+01	6.3E+00	na	1.2E+04
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.8E+03	--	--	--	--	--	--	--	--	--	--	na	1.8E+03
N-Nitrosodimethylamine ^C	0	--	--	na	3.0E+01	--	--	na	3.0E+01	--	--	--	--	--	--	--	--	--	--	na	3.0E+01
N-Nitrosodiphenylamine ^C	0	--	--	na	6.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodi-n-propylamine ^C	0	--	--	na	5.1E+00	--	--	na	5.1E+00	--	--	--	--	--	--	--	--	--	--	na	5.1E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	--	--	--	--	--	--	--	--	2.8E+01	6.6E+00	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB Total ^C	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	6.4E-04	--	--	--	--	--	--	--	--	--	1.4E-02	na	6.4E-04
Pentachlorophenol ^C	0	8.7E+00	6.7E+00	na	3.0E+01	8.7E+00	6.7E+00	na	3.0E+01	--	--	--	--	--	--	--	--	8.7E+00	6.7E+00	na	3.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
Radionuclides Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	1.1E+04	--	--	--	--	--	--	--	--	2.0E+01	5.0E+00	na	1.1E+04
Silver	0	3.2E-01	--	na	--	3.2E-01	--	na	--	--	--	--	--	--	--	--	--	3.2E-01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	na	4.0E+01
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	1.2E+00	--	--	--	--	--	--	--	--	--	--	na	1.2E+00
Toluene	0	--	--	na	6.0E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	2.8E-03	--	--	--	--	--	--	--	--	7.3E-01	2.0E-04	na	2.8E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	--	--	--	--	--	--	--	--	4.6E-01	7.2E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
Zinc	0	3.6E+01	3.6E+01	na	2.6E+04	3.6E+01	3.6E+01	na	6.6E+04	--	--	--	--	--	--	--	--	3.6E+01	3.6E+01	na	6.6E+04

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.6E+03
Arsenic	9.0E+01
Barium	na
Cadmium	2.3E-01
Chromium III	1.4E+01
Chromium VI	6.4E+00
Copper	1.5E+00
Iron	na
Lead	1.4E+00
Manganese	na
Mercury	4.6E-01
Nickel	3.8E+00
Selenium	3.0E+00
Silver	1.3E-01
Zinc	1.4E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Stats.exe Results

<p>Facility = Picture Lake Campground Chemical = Ammonia Chronic averaging period = 30 WLAa = 1.32 WLAc = 4.23 Q.L. = 0.2 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average = 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Acute Toxicity Maximum Daily Limit = 1.32 Average Weekly limit = 1.32 Average Monthly Limit = 1.32</p> <p>The data are:</p> <p>9.00 mg/L</p> <p>Per GM 00-2011 a datum of 9.00 mg/L is used to force an ammonia limit. This limitation is more stringent than the 2006 permit limitation.</p>	<p>Facility = Picture Lake Campground Chemical = TRC Chronic averaging period = 4 WLAa = 19 WLAc = 11 Q.L. = 100 # samples/mo. = 30 # samples/wk. = 7</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 20000 Variance = 1440000 C.V. = 0.6 97th percentile daily values = 48668.3 97th percentile 4 day average = 33275.8 97th percentile 30 day average = 24121.0 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 16.0883226245855 Average Weekly limit = 9.8252545713861 Average Monthly Limit = 7.9737131838758</p> <p>The data are:</p> <p>20000 µg/L</p> <p>Per GM 00-2011 a datum of 20,000 µg/L is used to force a TRC limit. The resulting limit is the same as the 2006 permit.</p>
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Attachment G: Stream Sanitation Memorandum (4/12/1991)

VIRGINIA WATER CONTROL BOARD

MEMORANDUM

SUBJECT: Effluent Limits for Picture Lake Campground & Green Acre Mobile Home Park, Discharge to Picture Run then to Hatcher Run, Dinwiddie County, ~~James~~ River Basin

TO: *[Signature]* Kurt Linderman via Golam Mustafa *[Signature]* Golam Mustafa

FROM: D. X. Ren *[Signature]*

DATE: April 12, 1991

COPIES: Diane Osborne, Jody Bryan, File

Purpose of Study:

The modeling efforts were caused by an inconsistency regarding DO limits in the existing modeling files of these above two subject facilities. This memo is to verify and determine appropriate effluent limits for the subject discharges.

Site Inspection:

A site inspection was conducted by me on March 28, 1991. Picture Lake Campground is currently owned by H & B, Inc., and is located downstream of a dam. The Green Acre MHP discharge is located 0.3 mile downstream of Picture Lake Campground STP. Picture Run runs 0.93 mile from Green Acre MHP and joins with Hatcher Run. Hatcher Run comes from Jordan Lake and ends at Steers Millpond. The two subject discharges are eventually contained in Steers Millpond. Site inspection indicated that Picture Run currently maintains a good or fair water quality (see Attachment-A).

7Q10 Flow Estimates:

According to the information in the existing modeling files, the critical flow used in previous modeling was 0.0337 cfs or 0.0218 MGD at the discharge point of Picture Lake Campground. In 1991, OWRP utilized a partial streamflow recording station on Whipponock Creek at Route 627 near Church Road (02041400) to synthesize critical flow for these discharges. This station was chosen on the basis of proximity, and, similarity in watershed size and topography (see Attachment-B).

Picture Lake Campground and Green Acre MHP

The characteristics for the Whipponock station are:

Drainage area = 3.27 square miles
7Q10 flow = 0.01 cfs
7Q10 runoff = 0.0031 cfs/m²

For the above two discharge points:

H & B of Virginia: Drainage area = 3.5 square miles
7Q10 flow = 0.01 cfs or 0.007 MGD

Green Area MHP: Drainage area = 3.73 square miles
7Q10 flow = 0.011 cfs or 0.007 MGD

My site inspection indicated that Picture Lake Campground STP discharges to Picture Run just 100 feet downstream of the dam. The dam releases water via a spray nozzle. According to the operator, during the summer season, the dam reduces water flow. OWRP's flow analysis assumed outflow from the impoundment equalled inflow to the Lake. It is possible that actual low flow for this stream could be different from OWRP's calculated 7Q10 flow due to the effect on flows of the impoundment. Investigation of the use of the Deep Creek (02041000) and Stony Creek (02046000) continuous recording gaging stations as reference gages would result in a larger 7Q10 flow range than the partial record station. In the absence of low flow data past the impoundment, it was decided to keep consistency with the previous efforts and use a 7Q10 value of 0.0337 cfs or 0.0218 MGD to rerun the model. This decision was made with consultation with OWRP. This 7Q10 value was previously used for simulating Picture Run.

Antidegradation Policy:

The modeling records made in 1977 indicated that antidegradation policy was not applied in both subject files.

Modeling Approach:

According to PRO modeling files, the latest modeling effort was made in March 1977. In 1986, Paul Herman applied the same limits except facility design flow to process a permit planning statement. No model was run at that time. The Streeter-Phelps Model of Monroe version was rerun to verify the effluent limits for the two discharges. Also the Steady State Model (version 5.0, 1990) was generated based on all previous assumptions for comparison.

Page 3

Picture Lake Campground and Green Acre MHP

Modeling Results:

The following effluent limits are acceptable:

Picture Lake Campground

$$\begin{aligned}Q &= 0.013 \text{ MGD} \\BOD_5 &= 30.0 \text{ mg/l} \\DO_5 &= 6.0 \text{ mg/l} \\BOD_u/BOD_5 &= 1.58\end{aligned}$$

Green Acre Mobile Home Park

$$\begin{aligned}Q &= 0.025 \text{ MGD} \\BOD_5 &= 30.0 \text{ mg/l} \\DO_5 &= 5.5 \text{ mg/l} \\BOD_u/BOD_5 &= 1.58\end{aligned}$$

The computer printout, copy of topographic map, and schematic showing the discharge points are attached for your reference.

If you have any questions, please let me know.

Attachments

Attachment H: Operator Training and Assistance Program



Operator Training and Assistance Report Picture Lake Campground VPDES Permit #VA0070564

Project Overview:

During the period from August 2009 through February 2010, the Office of Water Permits and Compliance Assistance, Operator Training program staff conducted an on-site training and assistance program at the Picture Lake Campground (PLC) wastewater treatment plant (WWTP). The program was a result of a recommendation by Piedmont Regional Office (PRO) compliance inspector Michael Dare and a request from PLC owner/operator, Ryan Porter. The activities of the Operator Training program are documented in this Training and Assistance Report (TAR).

Comprehensive Performance Evaluation:

On August 18, 2009, Jason Spicer, DEQ-Operator Training Program performed a comprehensive performance evaluation (CPE) of the PLC WWTP to assess treatment plant performance and evaluate the facility for inclusion in DEQ's operator training and assistance program. A copy of the full evaluation report is available on the enterprise content management system (ECM).

The evaluation identified the following performance limiting factors (PLF's) with process operations at the facility:

- The facility had been out of compliance with its VPDES permit for several months.
- It appeared the facility was not achieving nitrification resulting in Ammonia-N levels in excess of VPDES permit limitation.
- Process control sampling and testing was not being performed at the facility.
- The plant lacked a clearly defined Standard Operating Procedure (SOP) for the operation and maintenance of the treatment facility.

The best mechanism for addressing the performance limiting factors was determined to be an on-site training and assistance program.

Training and Assistance Activities:

A training and assistance plan was developed for the facility. A copy of the complete training plan is available on the ECM. The specific objectives of the training and assistance plan were to:

- Develop and implement standard operating procedures (SOPs) for process control of the activated sludge system to ensure compliance with applicable federal and state regulations.
- Develop and implement VPDES reporting procedures that meet all applicable permit requirements.

Training and assistance visits were made to the plant on September 29, 2009 and December 10, 2009. In addition, program staff provided assistance through phone, email and other electronic means (i.e., text). The PLC WWTP personnel had successfully completed the activities specified in the training and assistance plan and the project was completed on March 1, 2010.

After the project was completed, campground staff continued to request assistance regularly, with operations, as changes in the plant occurred. Since the operator training program staff do not act as the operator in responsible charge, a recommendation was made to campground management that they consider consulting a licensed contract operator to assist them with making daily operational adjustments to the process.

Accomplishments:

The following accomplishments are direct or indirect results of training and assistance received during the project:

- The facility was in compliance with its permit limit for Ammonia, and all other permit requirements, during the project activity months of August and October 2009 and from December 2009 – March 2010 consecutively. Sampling and testing data is presented as Attachment 1.
- The campground staff recognizes the importance of properly operating and maintaining the treatment system.
- The campground staff has initiated a SOP for all plant activities and is performing and documenting process control tests on a regular basis.
- The campground owner/operator has hired a licensed operator/consultant to assist him with the day to day plant operations.

Project Status:

- The campground owner has hired a contract operator.
- The Operator Training and Assistance program staff has no plans to provide onsite assistance to the campground at this time.

Attachment 1 : Picture Lake Campground DMR Data 2009 - 2010

2009			2010		
Month	Ammonia, mg/L Average	Ammonia, mg/L Max	Month	Ammonia, mg/L Average	Ammonia, mg/L Max
January	In April 2009, the facility ammonia limit went from an interim limit (4.0 mg/L) to the final limit (2.6 mg/L).		January	0.23	0.23
February			February	0.14	0.14
March			March	0.46	0.46
April			April	2.5	2.7
May	9.5	18.8	May	7.96	7.96
June	3.1	3.1	June	40.6	40.6
July	15.6	16.9	July	0.40	0.40
August	0.10	0.10	August	0.16	0.16
September	3.55	3.55	September	0.37	0.37
October	1.06	1.06	October	0.57	0.57
November	26.5	51.5	November	2.86	2.86
December	1.78	1.78	December	>0.1	>0.1

- Areas with no shading (White) represent campground operations prior to and after DEQ training program guidance
- The Light Gray shaded areas represent campground operations with DEQ training program guidance
- The Dark Gray shaded areas represent campground operations with contractor assistance
- The Yellow shaded numbers represent a permit exceedance

Attachment I: Threatened and Endangered Species Coordination



COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

MEMORANDUM

DATE: March 14, 2011
TO: Janine Howard, DEQ-PRO
FROM: Rene' Hypes, DCR-DNH
SUBJECT: VA0070564, Picture Lake Campground WWTP

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics historically documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

In addition, our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Shirl Dressler at (804) 367-6913.

Thank you for the opportunity to comment on this project.

*State Parks • Soil and Water Conservation • Natural Heritage • Outdoor Recreation Planning
Chesapeake Bay Local Assistance • Dam Safety and Floodplain Management • Land Conservation*



Virginia Department of Game and Inland Fisheries

3/22/2011 10:32:06 AM

Fish and Wildlife Information Service

VaFWIS Search Report Compiled on 3/22/2011, 10:32:06 AM

[Help](#)

330431.0

Known or likely to occur within a **2 mile radius of null**
(at 37,09,41.8 -77,30,59.8)
in 053 Dinwiddie County, VA

115 Known or Likely Species ordered by Status Concern for Conservation
 (displaying first 20) (5 species with Status* or Tier I**)

<u>BOVA Code</u>	<u>Status*</u>	<u>Tier**</u>	<u>Common Name</u>	<u>Scientific Name</u>	<u>Confirmed</u>	<u>Database(s)</u>
010214	FESE	I	<u>Logperch, Roanoke</u>	Percina rex	<u>Potential</u>	Habitat,BOVA,HU6
010347	SE	I	<u>Sunfish, blackbanded</u>	Enneacanthus chaetodon	<u>Potential</u>	Habitat,HU6
060081	ST	II	<u>Floater, green</u>	Lasmigona subviridis		HU6
070105	FS	III	<u>Crayfish, Chowanoke</u>	Orconectes virginienensis		BOVA,HU6
010077		I	<u>Shiner, bridle</u>	Notropis bifrenatus		BOVA
010174		II	<u>Bass, Roanoke</u>	Ambloplites cavifrons	<u>Potential</u>	Habitat,BOVA,HU6
010032		II	<u>Sturgeon, Atlantic</u>	Acipenser oxyrinchus		BOVA
020082		III	<u>Siren, eastern lesser</u>	Siren intermedia intermedia		HU6
020022		III	<u>Waterdog, dwarf</u>	Necturus punctatus		BOVA,HU6
060145		III	<u>Rainbow, notched</u>	Villosa constricta		BOVA
010038		IV	<u>Alewife</u>	Alosa pseudoharengus		BOVA,HU6
010131		IV	<u>Eel, American</u>	Anguilla rostrata	<u>Yes</u>	Collections,BOVA,HU6
010359		IV	<u>Lamprey, American brook</u>	Lampetra appendix		HU6
010040		IV	<u>Shad, American</u>	Alosa sapidissima		BOVA,HU6
010375		IV	<u>Shiner, ironcolor</u>	Notropis chalybaeus		BOVA

010179		IV	<u>Sunfish, banded</u>	Enneacanthus obesus		BOVA,HU6
010173		IV	<u>Sunfish, mud</u>	Acantharchus pomotis		BOVA,HU6
010149		IV	<u>Swampfish</u>	Chologaster cornuta		HU6
020069		IV	<u>Salamander, eastern mud</u>	Pseudotriton montanus montanus		BOVA,HU6
020034		IV	<u>Salamander, many-lined</u>	Stereochilus marginatus		HU6

To view **All 115 species** [View 115](#)

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; FS=Federal Species of Concern; SC=State Candidate; CC=Collection Concern; SS=State Special Concern (obsolete January 1, 2011)

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

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